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09/624,858	07/24/2000	Damien Castelain	0054-0216P-SP	6258

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EXAMINER	
MEW, KEVIN D	

ART UNIT	PAPER NUMBER
2664	6

DATE MAILED: 12/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/624,858	CASTELAIN, DAMIEN	
	Examiner	Art Unit	
	Kevin Mew	2664	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 July 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,7-10,15 and 16* is/are rejected.

7)☒ Claim(s) *3-6 and 11-14* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *5* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Detailed Action

Specification

1. The abstract of the disclosure is objected to because legal phraseology is used throughout the abstract. For example, "said method" in lines 2 and 4, "the present invention concerns" in line 3, "said modulation signals" in line 7, "said channel" in line 8, "said transmitter" in lines 9, "said receiver" in line 9, "said OFDM symbols" in line 9, "said transmitted modulation signals" in line 15. In addition, the phrase "Figure 3" in the last line of the abstract should also be removed. Furthermore, the abstract has exceeded 150 words in length that renders it improper according to the explanation below. Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. Claims 6-8, 14-16 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in

the alternative only. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Objections

3. Claims 1-16 are objected to because of the following informalities: the term "characterised" is not the standard US English terminology used for specifying what a method or an apparatus is comprised of. The word "comprising" should be used instead.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 1 recites the limitation "said channel" in page 17, line 7. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an

application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 7-10, 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Yoshikazu et al (EP 0836304 A2).

Regarding claims 1 & 9, Yoshikazu discloses a method for transmitting data from a DAB transmitter, and a Digital Audio Broadcast (DAB) receiver (see element 52, Fig. 1) for receiving data from a DAB transmitter (see element 51, Fig. 1) over a group of carriers (**multiple carriers**, see page 2, lines 40-43), the said transmitting method comprises of converting digital data into 4-phase-PSK modulated signals (binary to signal coding of data to be transmitted so as to form modulation signals, see page 2, lines 20-23), of multiplying the N 4-phase-PSK modulated signals (**modulation signals**, see page 2, lines 22-23) with sine and cosine carriers (**sub-carriers**, see page 2, lines 40-43) to form data symbols (**OFDM symbols**, see page 10, lines 41-43) to be transmitted over a transmission path (**over said channel between the said transmitter and the said receiver**, see element 53, Fig. 1), the data symbols are converted by A/D converter into digital data at a predetermined sampling frequency (**said OFDM symbols at a rate which is related to a sampling frequency referred to as the transmitter sampling frequency**, see page 11, lines 25-26), and, on the DAB receiver side, of a DFT window generator for outputting a DFT window signal **(clock signal)** serving as a Fourier transformation execution timing of each symbol (**determining, from a clock signal at a frequency related to a sampling frequency referred to as the receiver sampling frequency, an**

analysis window for the signal received from the transmitter so as to form a block of samples, see page 11, lines 26-28), of a Fourier transformer to perform a Fourier transformation process to the digital data for each symbol to demodulate original audio data (**estimating the said transmitted modulation signals by demodulating the said sub-carriers for said block of samples**, see page 11, lines 28-29), and of a sampling frequency control means (**estimation step**, see page 11, line 32) for calculating a change amount of barycentric position on the basis of a deviation between a DFT window position in a previous frame and a DFT window position in a current frame and controlling the frequency of the sampling pulse to make the error zero (**estimation step is designed to correct the changes in the position of the analysis window with respect to the said transmitted signal**, see page 11, lines 32-36).

Regarding claims 2 & 10, Yoshikazu discloses method of transmitting data from a DAB transmitter, and a Digital Audio Broadcast (DAB) receiver (see element 52, Fig. 1) for receiving data from a DAB transmitter, the said transmission method consists of having a Fourier transformer to perform a Fourier transformation process to the digital data for each symbol to demodulate original audio data (**estimation step consists of demodulating the said sub-carriers for said block of samples**, see page 11, lines 28-29), and of a sampling frequency control means for controlling the frequency of the sampling pulse to make the error zero (**the said step of correcting the changes in the position of the analysis window**, see page 11, lines 32-36) by detecting the frequency error (**consisting of estimating the phase difference**) of the

sampling pulse on the basis of a deviation between DFT window position in a previous frame (**symbol**) and a DFT window position in a current frame (**consisting of estimating the phase difference between two consecutive symbols and using this phase difference during said correction of the effects**, see page 11, lines 11-13, and lines 32-36).

Regarding claims 7 & 15, Yoshikazu discloses a method for transmitting data from a DAB transmitter, and a Digital Audio Broadcast (DAB) receiver (see element 52, Fig. 1) for receiving data from a DAB transmitter (see element 51, Fig. 1) over a group of carriers, the said transmission method comprises of an impulse response arithmetic section for arithmetically operating an impulse response (**estimating the response of a transmission channel**), of converting digital data into 4-phase-PSK modulated signals (**binary to signal coding of data to be transmitted so as to form modulation signals**, see page 2, lines 20-23), of multiplying the N 4-phase-PSK modulated signals (**modulation signals**, see page 2, lines 22-23) with sine and cosine carriers to form data symbols (**one or more distributed pilots transmitted at the same time as the said transmitted symbols**, see page 2, lines 40-43) to be transmitted over a transmission path, of a sampling frequency control means for controlling the frequency of the sampling pulse to make the error zero (**said transmission channel estimation**, see page 11, lines 32-36) by detecting the frequency error (**phase difference**) of the sampling pulse on the basis of a deviation between DFT window position in a previous frame (symbol) and a DFT window position in

a current frame (**applying the said phase difference between consecutive symbols**, see page 11, lines 11-13, and lines 32-36).

Regarding claims 8 & 16, Yoshikazu discloses a method for transmitting data from a DAB transmitter, and a Digital Audio Broadcast (DAB) receiver (see element 52, Fig. 1) for receiving data from a DAB transmitter (see element 51, Fig. 1) over a group of carriers (multiple carriers, see page 2, lines 40-43), which comprises of converting digital data into 4-phase-PSK modulated signals (**binary to signal coding is of differential type, characterized in that it consists of shifting the phase**, see page 2, lines 20-23), of multiplying the N 4-phase-PSK modulated signals with sine and cosine carriers to form data symbols (**consecutive OFDM symbols**, see page 10, lines 41-43) to be transmitted over a transmission path, of a Fourier transformer to perform a Fourier transformation process to the digital data for each symbol to demodulate original audio data (**differential demodulation for the carrier of index k of the nth OFDM symbol**, see page 11, lines 28-29), and of a sampling frequency control means for controlling the frequency of the sampling pulse to make the error zero by detecting the frequency error (**phase difference**) of the sampling pulse on the basis of a deviation between DFT window position in a previous frame and a DFT window position in a current frame (**by the said phase difference between consecutive OFDM symbols**, see page 11, lines 33-35).

Allowable Subject Matter

6. Claims 3-6 and 11-14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 3, data transmission method according to claim 2, characterised in that, for estimating the phase difference between two consecutive symbols, it consists of estimating the degree of shift of the sampling frequency of the receiver with respect to that of the transmitter,

$$\delta = \delta f_e / f_e^E = (f_e^R - f_e^E)/f_e^E$$

the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\pi k \delta T_s / T_u$$

where T_s is the total length of the symbol under consideration, T_u its useful part, k being the index of the carrier under consideration and n being the index of the OFDM symbol under consideration.

Regarding claim 4, data transmission method according to claim 2, characterised in that, for estimating the phase difference between two consecutive symbols, it consists of taking into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\pi k \alpha T_s / T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

Regarding claim 5, data transmission method according to claim 3, characterised in that, for estimating the phase difference between two consecutive symbols, it consists of taking into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\pi k(\delta T_s + \alpha T)/T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

Regarding claim 6, data transmission method to one of the preceding claims, characterised in that it consists of estimating the response of the channel for one or more reference symbols transmitted at the same time as the said phase difference between consecutive symbols to the said transmission channel estimation by means of the following recursive equation:

$$\tilde{H}_{k.n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$$

where

$\tilde{H}_{k.n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$ represents the estimation of the channel response for the carrier of index k and for the OFDM symbol of index n, $\beta'_{k,n}$ being the estimation of the phase difference between the consecutive OFDM symbols of respective indices n –1 and n for the carrier of index k.

Regarding claim 11, receiver according to claim 10, characterised in that, for estimating the phase difference between two consecutive symbols, it consists of estimating the degree of shift of the sampling frequency of the receiver with respect to that of the transmitter,

$$\delta = \delta f_e / f_e^E = (f_e^R - f_e^E)/f_e^E$$

the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\pi k \delta T_s / T_u$$

where T_s is the total length of the symbol under consideration, T_u its useful part, k being the index of the carrier under consideration and n being the index of the OFDM symbol under consideration.

Regarding claim 12, receiver according to claim 10, characterised in that, for estimating the phase difference between two consecutive symbols, it consists of taking into account the shift decision for the position of the said analysis window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\pi k(\alpha T)/T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

Regarding claim 13, receiver according to claim 11, characterized in that, for estimating the phase difference between two consecutive symbols, it consists of taking into account the shift decision for the position of the said analysis

window delivered by a window repositioning unit, the said phase difference between two consecutive symbols then being equal to:

$$\beta_{k,n} = 2\pi k(\delta T_s + \alpha T)/T_u$$

where T is the duration of a sample and α the shift decision value expressed as a number of samples.

Regarding claim 14, receiver according to one of claims 9 to 13, characterised in that it is designed to estimate the response of the channel for one or more reference symbols transmitted, by the said transmitter, at the same time as the said phase difference between consecutive symbols to the said transmission channel estimation by means of the following recursive equation:

$$\tilde{H}_{k.n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$$

where

$\tilde{H}_{k.n} = \tilde{H}_{k,n-1} e^{j\beta'_{k,n}}$ represents the estimation of the channel response for the carrier of index k and for the OFDM symbol of index n, $\beta'_{k,n}$ being the estimation of the phase difference between the consecutive OFDM symbols of respective indices n –1 and n for the carrier of index k.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure with respect to OFDM:

US Patent 5,313,169 to Fouche et al.

US Patent 5,506,836 to Ikeda et al.

US patent 5,521,943 to Dambacher

US Patent 5,444,697 to Leung et al.

US Patent 5,732,113 to Schmidl et al.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 703-305-5300. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on 703-305-4798. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

KDM
Art Unit 2664

RICKY NGO
PRIMARY EXAMINER